1923

Thirty-Fourth annual report of the agricultural experiment stations of the Louisiana State University and Agricultural and Mechanical College.

William Rufus Dodson

THIRTY-FOURTH ANNUAL REPORT

OF THE

Agricultural Experiment Stations

OF THE

Louisiana State University and Agricultural and Mechanical College

TO THE GOVERNOR

For 1922

BY

W. R. DODSON, Director

June 9, 1923.

To His Excellency, John M. Parker,
Governor of Louisiana.

Dear Sir:

I have the honor to submit herewith, the annual report of the Agricultural Experiment Stations of the Louisiana State University and Agricultural and Mechanical College, for the year 1922.

As required by act of Congress of March 2, 1887, providing federal aid for experiment stations of the several states, and in accordance with act of March 2, 1906, providing additional funds for research work at the experiment stations of the several states, a financial statement is appended, for the year beginning July 1, 1921, and ending June 30, 1922.

Very respectfully,

W. R. Dodson,
Director.

EXPERIMENT STATION STAFF

W. R. DODSON, A. B., B. S., Director.

W. H. DALRYMPLE, M. R. C. V. S., Vice-Director and Veterinarian.

W. G. TAGGART, B. S., Ass't Director, Sugar Station, New Orleans.

A. F. KIDDER, B. S., Agronomist and Ass't Director, Baton Rouge.

SIDNEY STEWART, Superintendent, North Louisiana Station, Calhoun.

J. MITCHELL JENKINS, B. S., Superintendent, Rice Experiment Station, Crowley.

B. SZYMONIAK, B. S., Horticulturist, Fruit and Truck Station, Hammond.

C. W. EDGERTON, Ph. D., Plant Pathologist, Baton Rouge.

HARRY MORRIS, D. V. M., Bacteriologist and Ass't Veterinarian, Baton Rouge.

T. H. JONES, B. S. Entomologist, Baton Rouge.

W. G. BRADLEY, B. S., Assistant Entomologist, Baton Rouge.

G. L. TIEBOUT, B. S., Horticulturist, Baton Rouge.

J. F. BREWSTER, Ph. D., Research Chemist, Sugar Station, New Orleans.

WM. L. OWEN, Ph. D., Bacteriologist, Sugar Station, New Orleans.

A. P. KERR, M. S., Chief Chemist, Fertilizer and Feed Stuffs Laboratory, Baton Rouge.

W. P. DENSON, B. S., Ass't Chemist, Baton Rouge.

J. H. JOLLY, B. S., Ass't Chemist, Baton Rouge.

J. L. FARR, M. S., Ass't Chemist, Baton Rouge.

COMPTON R. HUMMEL, B. S., In Charge of Records, Baton Rouge.

R. P. SWIRE, Treasurer, Baton Rouge.

MRS. RUTH HEIDELBERG, Secretary, Baton Rouge.

R. C. CALLOWAY, B. S., Superintendent of Dairy Farm, Baton Rouge.

J. K. McHUGH, Stenographer, Sugar Station, New Orleans.

E. K. BREEDEN, Farm Manager, State Station Farm, Baton Rouge.

PIERRE HERNANDEZ, Ass't Agronomist, Baton Rouge.

C. C. MORELAND, B. S., Ass't Plant Pathologist, Baton Rouge.

ALVERTA WRIGHT, Stenographer, Rice Station, Crowley.

STATION NO. 1

SUGAR EXPERIMENT STATION, AUDUBON PARK, NEW ORLEANS.

W. G. Taggart, Ass't Director in Charge.

SUGAR CANE WORK.

The work done at this station during the year was conducted with the strictest economy. In order to carry on all of the investigations possible with a decreased appropriation, it has been necessary to refrain from keeping up the general appearance of the station grounds that ordinarily is desirable.

FERTILIZER TESTS.

Work with nitrogeneous materials was discontinued for the time being; this being necessary in order that the plat set aside for such work could be used for growing 2500 new seedling canes.

Phosphoric acid tests gave results that are somewhat out of line with our usual findings. Two rations of 72 pounds phosphoric acid with 36 pounds of nitrogen (tankage as source) gave an increase of five tons over a check of no fertilizer. One ration of phosphoric acid with one of nitrogen gave an increase of 5.6 tons. A duplicate of this experiment in which nitrate of soda was used as the source of nitrogen gave only 0.83 of a ton increase where two rations of phosphate were used, and 4.31 where one ration was used. These yields are somewhat higher than usual in the case of one ration, and much lower than usual in the case of two rations. Two experiments out of three showed good gains where 90 pounds of sulphate of potash were used with nitrogen and phosphoric acid; the highest being 2.13 tons per acre, and the other 1.76. The third experiment showed a loss of 0.08 tons per acre. With cane valued at five dollars per ton, the monetary value of this experiment shows that the $2.52 invested in potash returned a net gain per acre of $6.28 in one instance, $8.03 in one, and a loss of $2.56 in one. Averaging the canes of the three experiments, a net gain of $3.75 per acre is shown. The ratio of suckers to stalks from planted eyes again is in favor of potash, with potash it being 2.2 to 1, while without

potash, 2.09 to 1. A question as to whether the potash in the potassium sulphate or the sulphur therein was responsible for the increase in yields in previous years, has been raised by several interested parties. In order to answer it, duplicate experiments were conducted in which the same amount of sulphur as is carried in 90 pounds of sulphate of potash was used with nitrogen and phosphoric acid, but no potash. No increase in the weight of cane harvested was shown.

Work with *Mellilotus Indica* as a catch crop was continued with good returns. A portion of the clover grown for this purpose was turned under on March 2, and the balance on March 20. The amount of clover turned under on March 20 was measured to determine the tonnage of green matter and the pounds of nitrogen per acre secured. It was found that 21,722 pounds of green clover per acre, containing 3,660 pounds of dry matter, had been grown, and that the clover carried with it into the soil 104.69 pounds of nitrogen. The check plat produced 10.46 tons of cane, the plat where clover was turned under on March 2, 14.08 tons of cane, and the plat where clover was turned under March 20, made 16.36 tons per acre. The average stand of cane per acre where no clover was turned under at harvest time was 16,203 stalks, where clover was turned under March 2, 18,951 stalks, and where clover was turned under March 20, 19,413 stalks. These figures show clearly that clover on fall plant cane will not injure the stand of cane when the clover is gotten off properly. The value of the increased tonnage of cane in the last experiment is $29.50 per acre, at five dollars per ton for cane, and the cost of 20 pounds of clover seed for one acre, and extra work, could not exceed $3 per acre. It is reported that all the clover seed that could be secured by our sugar planters was planted on fall plant cane last fall.

VARIETIES AND SEEDLINGS.

Twenty-five hundred new seedlings were received at the station from the Bureau of Plant Industry, United States Department of Agriculture, in April and May and were planted. Approximately 1700 of these came through the year without showing the effect of mosaic disease, and have been planted

again. Analyses of as many of the new canes as could be handled were made and some of them appear to grow rich enough in sucrose to be worth our attention. Nine of the older seedlings and one foreign variety showed very near immunity to mosaic disease, and the acreage planted to them was increased to the limit of cane grown. These canes will receive special attention, and it is hoped that at least one of them will relieve the critical condition brought about by mosaic disease.

Two lines of work were conducted on mosaic disease, both of them in cooperation with the Plant Pathologist. One of these experiments consisted in growing canes from healthy seed in comparison with canes grown from diseased seed, using varieties that were susceptible to the disease. Canes germinated from disease free seed came up healthy, but by harvest time were all diseased; but even then the damage by the disease was reflected. The average of two experiments using Purple cane, all healthy seed, was 16.54 tons, whereas the average from two experiments using the same variety of cane, but all diseased seed, was 15.78 tons. One experiment using D-74 healthy seed, gave 13.59 tons, against 9.54 tons from diseased D-74 seed.

The second and more important investigation consisted in selecting immune strains of D-74, Purple and L-511. This work has been carried on for several years, and is making such a good showing that it is being expanded, and recommended as a commercial proposition to the plantation owners. Results of this experiment show increase of 2.52 tons with Purple, 3.42 tons with D-74, and 2.49 tons with L-511, where the selected canes were grown in comparison with the general run of seed.

The annual Field Day of the Louisiana Sugar Planters' association was held in July, and was voted a success by those in attendance.

W. G. Raines, Jr., Assistant Chemist, resigned December 1, to go into the industrial field. No successor has been named.

ENTOMOLOGICAL DEPARTMENT

T. E. Holloway, Bureau of Entomology.

Cooperation in insect investigation has been maintained with the Bureau of Entomology, U. S. Department of Agriculture. In a statement issued to sugar journals in June, the theory was advanced that the heavy damage from the sugar cane borer *(Diatraea saccharalis crambidoides Grote)* each year is largely due to the hibernation of many borers in the planted seed cane, the moths emerging through the soil in the spring and depositing their eggs on the young plants. To destroy the borers in seed cane quite an elaborate series of experiments with a number of chemicals was conducted, but it was found that no substance was effective under field conditions.

A chance suggestion, however, was made the basis of other work in which there is some promise. Dr. E. W. Brandes, of the Bureau of Plant Industry, wished to ship uninfested seed cane from an infested section in Florida to a place in Georgia where the borer does not occur. He had the idea that soaking the cane in moderately heated water for a short time might kill the borers, and asked that the entomologists at the station conduct experiments along this line. Cane containing borers was soaked in water heated to various temperatures, being left for various lengths of time, and it was found that a temperature of 50 degrees centigrade (122 degrees Fahrenheit) for 20 minutes, killed all borers without injuring the germination. In fact, the germination was hastened, and some treated cane planted in October germinated so satisfactorily that in December there was a stand as good as that usually secured in June. Three varieties of cane were used, and comparing their germination with untreated cane planted at the same time, it was found that there was an increase in germination of from 191 to 264 per cent. This offers great promise to the sugar planters, not only in controlling the cane borer but in prolonging the growing season and securing a better stand of cane.

Inspections of fields at various plantations were made in the fall for the Cuban parasites (*Euzenilliopsis diatraeae* Townsend) which were brought from Cuba in 1919 and 1920 by the Bureau of Entomology cooperating with a number of sugar

planters. Parasites were found at 14 plantations, and it is likely that they occur at several others, as they have been found elsewhere during other years. Few parasites were found, but to continue their existence it is necessary that they make a constant attack on the cane borer, and this is of great benefit. It seems that they may have accomplished more in lessening the damage from the borer than can definitely be ascribed to them.

Another parasite (*Habrobracon brevicornis* Wesmael) received through the kindness of Dr. L. O. Howard, Chief of the Bureau of Entomology, was reared and released during the year. This was a parasite brought from southern France in the work against the European corn borer in the northern states. Dr. Howard thought that it would attack the sugar cane borer, and this was found to be correct. About 1500 of the parasites were released at a plantation near New Orleans, but it has not yet been found that they attacked the borers in the fields

At a farm where little cane is grown, but where corn suffers greatly from the borer every year, examinations were made to determine the source of this infestation. It was found that borers were hibernating in so-called "broom sedge" (*Andropogon glomeratus*), and it is likely that with the destruction of this harboring plant around the edges of the fields the borer damage would be considerably reduced.

The Bureau of Entomology is investigating sugar cane insects not only in Louisiana, but in Texas, Mississippi and Georgia, but headquarters for all this work is maintained at the Sugar Experiment Station at Audubon Park.

CHEMICAL RESEARCH DEPARTMENT

Dr. J. F. Brewster, Chemist.

Initial clarification of cane juice as it comes from the mill is perhaps the most important step, from the chemical point of view, in the manufacture of sugar. Upon the thoroughness of the clarification depends the ease of operations which follow and the quality and yield of the final products.

A trial was made in the grinding season of 1921-22 of the efficiency of kieselguhr alone in clarification. Excellent clear

juice is thus obtained, but the resulting sugar cannot be washed white. The color is always slightly yellow.

During the past grinding season, 1922, an innovation in the use of lime and sulphur in juice clarification was tried. The mill juice being first limed to neutrality, heated and settled in the usual manner, the clear juice then being lightly sulphured. This treatment yields a white sugar and it is thought that less impurities are introduced than when the usual procedure of sulphuring and then liming is carried out. Some necessary laboratory work on this process is now being conducted.

Preliminary tests upon bagasse char as a filtering medium have been made and these, having shown promise, will be completed.

In cooperation with one of the large sugar refineries an analytical method for the determination of moisture in raw sugars was tried. The results indicate that the time of this determination may be materially shortened.

Two new pieces of apparatus, which may be of general use to chemists, were devised at the Sugar Experiment Station laboratory. One is an internally heated vacuum pan for conducting evaporation under reduced pressure, the other is a simple check valve for use with the water vacuum pump.

BACTERIOLOGICAL RESEARCH DEPARTMENT

Wm. L. Owen, Bacteriologist.

The investigations that have been carried out in this department during the past year have, with few exceptions, been essentially the same as outlined in the report for 1921. Some of the investigations have been completed and the results submitted for publication in various scientific journals. New projects have been substituted for these, and are to be included with the uncompleted investigations in our program of work for the coming year. The work of this department as a whole has been almost exclusively confined to a study of the problems of sugar deterioration in storage, with the purpose of devising means for its prevention. The principal project of the department has

been and will continue to be a direct study of this problem. The selection of the secondary lines of investigation has been with a view of improving our opportunities for the successful solution of our main problem by building a broader foundation of knowledge from which to proceed further. The investigations that have received attention in the department during the past year and the progress that has been made, are as follows:

THE DETERIORATION OF SUGARS BY MOLD FUNGI.

A study of thirty species of mold fungi isolated from various sugars showed that they varied greatly in the rate at which they caused sugar to deteriorate, and in their moisture requirements. A point of practical significance in connection with this fact is that the amount of moisture a sugar may contain without undergoing deterioration will depend upon the species of mold with which it is infected. A study was made of the extracts from all of these species, and some of these extracts were found to be capable of causing the inversion of sucrose at densities at which the mold from which the extract was taken was incapable of development. *Aspergillus repens* was the most active inverting type of any of the species that were studied. The results of this investigation are now ready for publication.

A STUDY OF THE FORMATION OF GUM LEVAN IN SUCROSE SOLUTIONS BY BACTERIA COMMONLY OCCURRING IN RAW SUGAR.

The purpose of this investigation was to ascertain whether sucrose or invert sugar is the source of gum levan formed in this type of fermentation so prevalent in the products of cane sugar factories. The results showed that sucrose, and not its inversion products, is the source of gum levan. The reaction of limed juice is more favorable for this fermentation than either the raw or the sulphured juice. The results of this investigation have been submitted for publication in the Journal of Bacteriology.

A STUDY OF THE EFFECT OF MANUFACTURING CONDITIONS UPON THE KEEPING QUALITY OF SUGARS.

The purpose of this investigation was to determine the manufacturing conditions necessary to produce sugars that conform

in composition to the "factor of safety." The results obtained show that the manufacture of sugars conforming to this factor depends upon beginning with a sirup of such a purity that when exhausted as far as practicable it will leave a film of exhausted molasses surrounding the sugar crystals. This film will be unsuited both in density and purity for the development of microorganisms, and hence the sugar will not deteriorate in storage unless it absorbs more moisture. The results of this investigation are now appearing as a series of articles in the International Sugar Journal of London.

INVESTIGATION OF THE PREVENTION OF SUGAR DETERIORATION IN STORAGE.

This investigation has been vigorously prosecuted during the past year, and very promising results have been obtained. Many experiments were carried out on the value of pasteurization as a means of preventing sugar deterioration, but the results have not been consistently favorable. Experiments on the inhibitory effects of carbon dioxide gas upon the mold fungi found in sugar, have yielded some very promising results. One of the most important phases of the problem of the deterioration of sugars is their moisture absorbing properties. A study of this phase of the problem has been carried on during the past year. Through the courtesy of Mr. George P. Meade, of the Cardenas Refinery of the Cuban-American Sugar Company, five samples of Cuban 96 test sugar of measured and standardized grain, representing sizes Nos. 3 to 7 inclusive, were obtained for study. The rate of moisture absorption of these samples was studied under varying conditions of humidity. A similar study of plantation white sugar is soon to be undertaken. Samples of these sugars were obtained from a large number of plantations throughout the State during the present grinding season, and much interesting data is expected to result from a study of them.

A STUDY OF THE ACTION OF VARIOUS VEGETABLE CARBONS IN THE REMOVAL OF MICROORGANISMS FROM JUICES AND SIRUPS IN THE PROCESS OF CANE SUGAR AND SIRUP MANUFACTURE.

The current claims regarding the effect of vegetable decolorizing carbons in preventing the fermentation of cane juice and sirups, are lacking in scientific verification. It was for the purpose of determing the value of these apparently extravagant claims that this investigation was undertaken. The work has been conducted on a laboratory scale during the recent grinding season, and the results obtained are of much interest. Norit, Darco and Suchar are the carbons that are being used in the investigation.

A STUDY OF THE OCCURRENCE IN LOUISIANA SUGAR HOUSES OF BACTERIA DEVELOPING AT HIGH TEMPERATURES.

A recent investigation of the clouding of clarified juice in Hawaii resulted in the isolation of species of bacteria developing at temperatures as high as 165°F., and at densities up to 25 Brix. During the recent grinding season, samples of raw and filtered juices were stored at high temperature, but no indication of this action was observed. The work is to be continued during the year.

This department was fortunate in having the services of a free assistant during about seven months of the year. Mr. James U. Wilkinson, a vocational training student, acted as our assistant during that time, and rendered very valuable service. The present lack of assistance is particularly to be regretted at this time in view of the interesting and elaborate program of work outlined for this department during the coming year.

Mr. J. D. Bond, a graduate student of the University, spent about two months in the laboratory, carrying out some special work on molasses fermentation under the direction of this department.

STATE STATION

BATON ROUGE, LA.

FARM DEPARTMENT

A. F. Kidder, Agronomist.

Pierre Hernandez, Ass't. Agronomist.

E. K. Breeden, Farm Manager.

The agronomy work in 1921-22 was along the same general lines as reported previously.

SOIL FERTILITY.

No change or addition to the soil fertility projects was made in 1922. The two plats comparing the application of a mixture of cottonseed meal and acid phosphate to continuous corn at different periods of growth and with and without organic matter, show the same general results; that is, the organic matter plat gave a considerably higher yield. A study of the soil of these two plats was begun this past winter in cooperation with the Collegiate Department of Agronomy. This study covers mainly the physical characteristics.

Velvet beans in comparison with soy beans and cowpeas for green manuring, continued to give better yields of cotton in the two-year rotation of cotton, oats, and legume. Soy beans sown in corn at the last cultivation increased the yields of cotton as in previous years. Continuous cotton was not profitable. Neither was cotton in a rotation of corn and cotton without a legume. In continuous corn cultivation with velvet beans, soy beans, and cowpeas for a legume, the largest yield was obtained with the velvet bean. The velvet bean appears to be a better green manure crop for corn and cotton on the bluff soils than soy beans or cowpeas.

The application of limestone with acid phosphate and raw rock phosphate on the bluff soils for alfalfa has given fairly good results. The source of phosphorus seems to make very little difference in the yield. No definite recommendations can be given, however, regarding the use of limestone on the bluff soils, for alfalfa or for any other crop, at this time.

CROP PRODUCTION.

Lespedeza has been grown successfully two years without re-plowing and re-seeding the crop. The third year a considerable amount of grass and weeds has come in, making the hay crop less profitable and the seed crop very much inferior. It is recommended that two year old lespedeza meadows be plowed and seeded to oats in the fall and re-seeded to lespedeza in the spring. This cannot be carried on indefinitely, but on good land may be repeated several times.

The variety tests of corn, cotton, oats, soy beans, and sugar beets have been continued. The corn varieties are planted at the rate of 5800, 6900 and 8700 plants per acre. The prolific varieties can be planted considerably thicker than the large eared varieties.

The long staple cotton varieties have not produced as high a yield as the short ones, but the value of the crop is slightly higher because of the premium offered for staple cotton. This work has not been continued sufficiently long to make definite recommendations regarding the variety for the bluff soils.

The Station strain of the *Patterson oats* has continued to give the best results among the oat varieties. This variety is recommended to the farmers.

Sugar beets were as promising as reported in 1921. Earlier planting produced larger yields per acre.

Biloxi and *Mammoth Yellow soy beans* have given the largest yield of seed. Otootan, Virginia and Barchet varieties are better for hay. It seems at the present time that the Ebony soy bean may be used for early seed production. Many other varieties have been planted but none have proven as good as those mentioned.

Corn and Velvet Beans planted in every row has produced a larger yield of corn and practically the same amount of velvet beans as when planted in every other row or two rows of corn and one row of beans.

In cooperation with the office of Forage-Crop Investigations, Bureau of Plant Industry, U. S. Department of Agriculture, more intensive work with the clovers was started in the fall of 1922. No results are ready for publication.

In planting corn at different dates, early planting has given the highest yield for two years, and less damage from insects and diseases has been noted. This project is in cooperation with the Station Entomologist.

The "Place Effect" cotton project, in cooperative agreement between the U. S. Department of Agriculture and several southern Experiment Stations, has been continued. The Alabama Station has charge of the ginning and the U. S. Department of Agriculture has charge of grading, determining the length of staple and the per cent of staple.

PLANT BREEDING.

Individual selection of cotton plants with Louisiana No. 1 has been continued. Last season several thousand plants were available for work. Field and laboratory notes are made on all promising plants. The selections are made on the basis of earliness, yield, per cent of lint, length of lint, resistance to disease, etc.

Individual plant selection and hybridization has been continued with oats. A few progeny of selections made in 1919 are still worthy of keeping in the nursery. Field selections are made every other year and only the most promising plants are kept in the nursery after the first year.

In cooperation with the Station Plant Pathologist, the improvement of corn by selection and hybridization has been continued. Yield together with stalk characteristics and disease resistance are given prominence. No data are ready for publication on this work at this time.

STUDIES ON COST OF PRODUCTION.

The cost of producing crops to be "hogged down" and of growing hogs from farrowing to marketing, has been discontinued. The data for the past three years are now in bulletin form and being issued as Bulletin No. 187. This project has been in cooperation with Dr. W. H. Dalrymple, Veterinarian.

DEPARTMENT OF PLANT PATHOLOGY

C. W. Edgerton, Pathologist.

During 1922 there was little change in the nature of the work in the Department of Plant Pathology from that of previous years. However, less time was given to the tomato wilt and more to the sugar cane and corn projects.

Besides the regular project work, considerable time was given to the equipment of the new laboratory and to the procuring of photographs and specimens of the various plant diseases of the State. This was necessary as a result of the fire of the previous year which destroyed everything in the department laboratory.

The projects receiving attention in 1922 were those on sugar cane diseases, corn root rot and tomato wilt. Besides these, as usual, some time was allotted to the plant disease survey and to the potato mosaic disease project of the Horticultural department. The projects on the Sclerotium wilt disease, the cotton wilt, and the alfalfa diseases received no attention other than general field observations.

SUGAR CANE DISEASE.

Most of the work on sugar cane has been on the mosaic disease. This disease is now in all parts of the sugar belt and is causing considerable loss. The work on the disease has been carried on at Audubon Park, New Orleans.

The work for several years has been directed towards procuring strains from our best varieties that are more or less resistant to the disease. The selected strains in the mosaic plots at Audubon Park produced from two to four tons to the acre more cane than the unselected. These plots were very striking and attracted considerable attention, from the sugar planters of the State. The work of the L-511 cane was also continued. This cane is the most resistant to infection of any of the commercial canes grown in the State. The work has shown that disease-free seed of this variety can be readily selected at planting time. Cane selected in this way has given an increased tonnage of ten to fifteen per cent.

CORN ROOT ROT.

The corn root rot work has been carried on in cooperation with the Station Agronomist. The principal work in 1922 was the testing out of two hundred ears of corn as to germination, yield, and the presence of the root rotting organisms in the seed. It is necessary to carry this work on through several seasons before reliable conclusions can be made. We are also testing out the possibility of selecting the corn for seed in the field early in the season in order to reduce the percentage of infection in the seed.

TOMATO WILT.

Tomato wilt work was practically confined to the growing of seed of the Louisiana Wilt Resistant varieties. These varieties are giving excellent results and it is now impossible to supply the calls for seed throughout the State. Several hundred packets of this seed were sent out by the Extension Department in 1922, with very favorable results. This season, 1923, over 2000 packets are being distributed. These varieties yield on an average of from two to three tons more to the acre than ordinary varieties and have given excellent results in all districts except in localities where troubles other than the wilt, principally the nematode root galls, have killed all varieties.

DEPARTMENT OF ANIMAL PATHOLOGY

W. H. Dalrymple, Veterinarian.

Harry Morris, Bacteriologist and Assistant Veterinarian.

During 1922 the work in the Department of Animal Pathology was continued along the lines previously reported. The fire in the latter part of the year 1921 was especially disastrous to this work, beacuse of the destruction of very valuable material regarding which years of accumulated data was becoming very valuable.

Some difficulty was experienced in obtaining new material for some projects.

Practically all of the anthrax has been renewed. A study of the blood-sucking insects as disseminators of anthrax has been carried on during the past year with the following results: An-

thrax has been transmitted from guinea-pigs to other experimental animals by several species of Tabanus. The highest percentage of infections was obtained from T. Quinquevittatus. They proved to be ferocious feeders upon the horse, or experimental animals. Fifty per cent infections were produced when a single fly was permitted to feed upon an infected guinea-pig and afterwards transferred to a healthy one.

In a great many cases the internal form of anthrax was produced.

This fly is bright brown in color, and is very common in Louisiana during the summer months.

Anthrax was also transmitted by several other species of Tabanus, but the percentage of infections did not run as high as in the experiments above mentioned.

Several species were studied with negative results. Some would not feed in captivity.

All flies were collected from horses in the fields and woods, and identified by Mr. W. G. Bradley of the Entomology Department.

No serious outbreak of anthrax occurred in the State during the past year. This might be considered somewhat singular as the disease has usually made its appearance in overflowed sections following high water. However, it is probable that more widespread vaccination and the better observance of sanitary measures may have obviated previous conditions to a large extent.

Quite a number of specimens were examined at the laboratory during the season, but very few cases of anthrax were found.

By the continued use of anthrax vaccine, and observing the common rules of sanitation as far as possible, the Station passed its eleventh year without a case of anthrax among the livestock.

INFECTIOUS ABORTION.

The infectious abortion work was practically brought to a close by the complete eradication of the disease from the dairy herd. The calf crop has been normal during the past year; and it is hoped that this condition may continue, and that an abortion-free herd will be moved from its present quarters to the new College Farm.

The Department has conducted, during the year, quite a voluminous correspondence with stockowners throughout the State concerning veterinary and allied topics.

The Department suffered a great loss through the resignation of Dr. Gerard Dikmans, who left to take post-graduate work at the University of Minnesota. Dr. Dikmans was making a study of the parasites of livestock in the State, and a great deal of valuable information was obtained, which is being published in bulletin form as a preliminary report.

DEPARTMENT OF ENTOMOLOGY

THOS. H. JONES, Entomologist.

W. G. BRADLEY, Assistant Entomologist.

During the year 1922 the research work had to do principally with certain insects injurious to corn and to livestock in Louisiana. In addition to this work the collection of insects, particularly those of Louisiana, used both for display purposes and in connection with the identification of insect material sent in by correspondents, was considerably increased. Special attention in this respect has been given to the scale insects, collections and notes on forty-eight species occurring in the State now being available.

As usual, numerous letters, asking for information relative to various insects, have been received and answered. An article on the cottony-cushion scale, intended for publication as an extension circular, and a paper giving some of the results of our observations on horse flies, have been prepared. A few short articles relative to insects have also been given to the press during the year.

The cooperative work with the Bureau of Entomology, United States Department of Agriculture, on truck crop insects has been continued. Mr. C. E. Smith of the Bureau of Entomology, and Mr. Guy Fletcher, a student assistant, have been engaged in this work during the past year.

INSECTS INJURIOUS TO CORN.

Observations have been made on the life-histories and habits of the "Southern corn root worm", the "Corn earworm" and

the "Sugar-cane moth borer", all of which are important insect pests of growing corn in Louisiana. Some attention has also been given to the "Rice weevil", or "Black weevil", in relation to the injury it causes to stored corn.

INSECTS INJURIOUS TO LIVESTOCK.

Considerable progress has been made on the project having to do with horse flies, especially in regard to the habits of the adults and immature stages of the various species. The habits of the immature stages of most of the species occurring in the State have been but imperfectly known and we have been able to secure some valuable information regarding them.

HORTICULTURAL DEPARTMENT

G. L. Tiebout, Horticulturist in Charge.

Since the reduction in the appropriation for the Experiment Stations, it has been necessary to discontinue some of the Experiment projects under way, and the work of the Horticultural department has suffered some curtailment. However, the new Fruit and Truck Experiment Station, situated near Hammond, began active operations in the spring of 1922, and the work to be done there will take the place of some of the projects that were under way at Baton Rouge.

TRIUMPH IRISH POTATO SEED IMPROVEMENT WORK.

The object of this investigation, in cooperation with the United States Department of Agriculture, is to determine the actual value of superiority of certified, or inspected, Triumph seed stock over uncertified or uninspected Triumph stock as ordinarily offered to the southern grower by dealers in his community. The inspection in connection with certified seed is usually performed by specialists of the Agricultural College of the State where the certified stock is grown, and the certificate is based on high standards determined by two inspections in the field and one in the storage bin.

This was the fourth year of the five year period for the progress of this test. Four lots of Nebraska certified Triumph seed and four lots of Wisconsin certified Triumphs as well as some

lots from other states were planted for comparison with five lots of uncertified Triumph seed purchased from dealers at four Louisiana seed-distributing centers. The season was not very favorable, but the average yield of certified over uncertified seed was very marked, as in the previous year.

Some field tests conducted in Rapides parish also demonstrated the superiority of certified Triumph seed over uncertified stock of the same variety. Yields from Nebraska certified seed approched 250 bushels per acre—a record for that section.

Home-grown Triumph seed one year removed from Northern-grown certified seed of the same strain did not yield nearly as much as the new (northern-grown) seed. Under the general prevalence of the Mosaic disease in the Triumph variety, this test, after a period of years, may indicate that it does not pay to use home-grown seed for the early crop.

The Mosaic disease was about to wipe out the Triumph industry in Louisiana. Through information obtained largely from these tests, planters of early Triumph potatoes are regaining confidence in the industry and fifty to seventy-five car loads of certified Triumph potato seed, mostly from Nebraska, will be planted during the coming season.

This work in connection with certified Triumph seed potatoes has attracted national attention, and we are reputed to be leading the South in this line of activity. States other than Nebraska and Wisconsin, notably North Dakota and Montana, are becoming interested in the development of a market for their certified Triumph seed in the South, and various strains are being sent here for trial.

OTHER ACTIVITIES.

The Louisiana Creole onion seed improvement work, variety tests of annual flowers, production of seed of wilt resistant tomatoes of the Louisiana Red and Louisiana Pink varieties, and the culture of rhubarb and sweet corn for the home garden were continued during the past year.

FERTILIZER AND FEED STUFFS LABORATORY

BATON ROUGE.

A. P. Kerr, Chief Chemist.

During the year 1922 the chemical laboratory made the analyses of 1,545 samples of feed stuffs and 2,085 samples of fertilizers. The analyses were made for the State Department of Agriculture.

The laboratory was called upon from time to time during the year, to make analyses for the other departments of the Station.

The amount of miscellaneous work, such as analysis of mineral waters, etc., has increased very largely during the last few months. A great many soils samples were sent to the laboratory for analysis and while these analyses may mean a great deal to one making a scientific study of some particular soil problem, they mean very little to the farmer, especially when taken in places without any history of their location.

During the year samples of mixed feeds were sent to the laboratory that were suspected of containing some kind of poison injurious to animals. Only a small percentage of these samples showed that they contained poison.

EXPERIMENT STATION DAIRY

BATON ROUGE.

R. C. Calloway, Superintendent.

DEVELOPMENT OF THE HERD.

The present dairy herd has been developed during the past fifteen years from a few foundation cows, with an occasional purchase of new lines of breeding. The herd now consists of eighty-five animals, which includes twenty-nine Holsteins, owned by the Experiment Station, fourteen Holsteins owned by the University, thirty-nine Jerseys owned by the Experiment Station, one Jersey and one Guernsey owned by the University and one cross-bred owned by the Experiment Station.

Four young bulls of excellent breeding and splendid type were donated to the Governor for the University and these have received care and attention at the dairy. These bulls consist of

one Jersey given by the Cap Rock Jersey Farm, Crosbyton, Texas; one Jersey given by the Idlehour Stock Farm, Lexington, Ky.; one Holstein given by Mr. J. J. Orr, Crosbyton, Texas; and one Guernsey given by Mr. Joe Trees, of Pennsylvania.

Ten Holstein cows in the herd are in the Advanced Registry. One held the State record in the senior four-year-old class, with a production of 10,201.4 lbs. of milk and 345.97 lbs. butterfat which is equal to 432.46 lbs. butter. Unfortunately we lost this cow by accident.

Several bull calves were given to boys calf club members of the State. Three of the cows added to the herd have proven to be very valuable animals, one especially, as she now holds the herd record for milk production, having produced 15,025 lbs. of milk and 560 lbs. of butter in 365 days.

Of the forty-one Jerseys in the herd, fourteen cows are in the Register of merit and several others are on test, with a good chance to gain the same distinction. One will be reported in a few days as a State champion in the two-year-old class, with a production of 9,246.3 lbs. of milk and 448.72 lbs. of fat. During the year six animals were sold for breeding purposes, seven died (mostly calves at birth), five were bought, two were exchanged, and five bulls and one heifer were given as prizes to calf club members.

The herd is kept for experimental, instructional, and demonstration purposes.

EXPERIMENTS.

Several feeding trials are being carried out. One consists of a ration of rice bran, cotton seed meal, and molasses, compared to one of corn meal, wheat bran, cotton seed meal and molasses. The former mixture proved slightly inferior. A feeding trial of stock beets against corn and soy bean silage is being conducted.

INSTRUCTION AND DEMONSTRATION.

The herd is used for University student instructional work, cow demonstrations, judging by the parish club members and agents, and State Agricultural high schools, and judging butterfat testing by the students of the College of Agriculture.

CROPS.

The crops of last session consisted of corn and soy beans for silage, corn and velvet beans, oats, root crops, and lespedeza for pasture and hay. Very favorable results for both pasture and hay have been gotten by sowing lespedeza in oats, grazing the oats and lespedeza until July 15, and then allowing it to grow until September, for hay.

Owing to the intention of moving the herd to the new College farm, no crops other than hay were planted.

During the Farmers' Short Course in January, 1923, a Jersey show was held, in which the Experiment Station animals were very conspicuous for their excellence.

NORTH LOUISIANA EXPERIMENT STATION

CALHOUN

SIDNEY STEWART, Superintendent.

The work at this Station for the past year was practically the same as has been carried on for the past several years, with addition of the demonstration work in cotton, corn and peas, and corn and velvet beans, on three separate areas in the "Lee" fields, situated in the southeastern part of the Station property.

A "Model Farm Orchard" was put out on a plot of two acres, northeast of the Superintendent's residence. This is a demonstration and an experiment in line with the efforts of the Experiment Station and Extension department in getting an orchard on as many farms as possible.

A flock of purebred S. C. Rhode Island Red poultry was bought in March from the Owens Farms, Vineyard Haven, Mass. Two poultry yards and a house to accommodate one hundred hens were built according to plans furnished by the Extension department. A "Buckeye" incubator and a brooder were also bought. The results thus far, have been unsatisfactory. A number of the birds died from various causes, and the remaining ones are comparatively inactive and slothful.

The demonstration work in the Lee field is on the ground which has been used for silage and necessitated growing the silage crops in the "Old Peach Orchard" field. The soil is too poor to produce profitable crops and has consequently been fallowed for the past three years. Owing to the late start in all the work of the Station, and the silage being left until most of the other crops were in, only about thirty tons of a poor grade of silage were produced. The excessive rainfall in the spring and summer retarded the work through the planting and cultivating seasons.

Calcium arsenate was used on the cotton fields, with very satisfactory results in controlling the boll weevil.

In the experiments and general crops grown on the Station during the year, 367 bushels of corn (besides what was grazed

by the hogs and fed from the field), 13,681 pounds of cotton, 188 bushels of sweet potatoes, and about 14 tons of hay, were produced and harvested. A fairly good crop of velvet beans and cowpeas was grown.

Most of the buildings have been put in good repair, some of them having been taken down and rebuilt, using galvanized iron for the new roofs. An addition to the Superintendent's residence has been built and a fifty-six battery Delco electric light plant installed. All of the buildings on the grounds are furnished with lights.

The regular monthly agricultural meetings were held during the year. The second fair, since being discontinued in 1917, was held three days during October. A creditable display of agricultural products and livestock was made.

THREE YEAR ROTATION EXPERIMENT.

In this experiment, one-third of the area is planted to cotton, one-third to corn and peas, and one-third to oats, followed by peas. During the period between 1889 and 1908, the east half of each plot received an application of compost, at the rate of 30 bushels per acre. This compost is made up of green cotton seed, stable manure, and acid phosphate. Since 1908 the applications of compost have been made to the south half of each plot; therefore, one-fourth of each plot has received compost annually since 1889; one-fourth has received compost since 1908; one-fourth had received compost until 1908; and one-fourth has had no compost.

The results for 1922 on these plots are as follows:

	SE¼	SW¼	NE¼	NW¼
	¼ of plot fertilized with compost annually since 1889.	¼ of plot fertilized with compost annually since 1908.	¼ of plot composted until 1908.	¼ of plot with no compost since 1889.
Plot A Cotton.	1689.8 lbs. seed cotton per acre.	975.4 lbs. seed cotton per acre.	1174.2 lbs. seed cotton per acre.	684 lbs. seed cotton per acre.
Plot B Corn	22.33 bushels per acre.	20.37 bushels per acre.	15.11 bushels per acre.	12.48 bushels per acre.
Plot C Oats	2.23 tons hay per acre.	1.48 tons per acre	1.98 tons.	1.21 tons hay per acre.
Peas	2.10 tons hay per acre.	1.60 tons per acre	2.01 tons.	1.04 tons hay per acre.

MANURE ROTATION EXPERIMENT.

		Plot 1 Corn Bu. per Acre	Plot 2 Oats Tons of hay per Acre	Plot 2 Peas Tons of hay per Acre	Plot 3 Cotton Lbs. per Acre
*Plat	No. 1	21.20	2.36	5.88	780
"	" 2	33.40	3.04	6.44	1040
"	" 3	39.00	4.48	6.44	1640
* "	" 4	24.60	2.08	5.00	1160
"	" 5	34.60	2.78	4.72	1300
"	" 6	36.80	2.84	5.28	1680
* "	" 7	22.20	2.16	3.24	960
"	" 8	29.40	2.24	4.64	1280
"	" 9	37.20	3.12	4.84	1780
* "	" 10	20.20	1.64	3.60	1100
"	" 11	24.60	1.96	3.80	1260
"	" 12	26.60	2.84	3.84	1660
* "	" 13	24.80	2.10	4.40	1140
"	" 14	21.40	2.44	4.60	1340
"	" 15	26.60	2.96	5.28	1400
* "	" 16	23.40	1.44	4.20	1040
"	" 17	27.20	2.00	4.40	1300
"	" 18	29.40	2.60	4.60	1560
* "	" 19	17.20	1.84	3.20	1244

*Check Plats.

April 13. Planted corn.
October 23. Harvested.

November 27, 1921. Drilled in oats.
May 30, 1922. Harvested.

July 7. Planted peas.
September 9. Harvested.

May 6. Planted "Wanamaker's Improved Cleveland Big Boll" cotton.
September 6-7. Picked cotton.
October 17. Picked cotton.

EXPLANATION OF MANURE ROTATION PLOTS.

Corn and velvet beans, oats followed by cowpeas or soy beans, and cotton with oats and crimson or burr clover, at last cultivation. Oats and clover to be drilled between the rows of cotton.

Fertilizers

CORN

Plats 1, 4, 7, 10, 13, 16, and 19 are permanent checks, without manure.

Plat 2.—6 tons manure per acre, applied broadcast after plowing and then thoroughly disced into the soil.

Plat 3.—6 tons manure same as in No. 2 plus chemical fertilizer.
8 lbs. Nitrogen in cotton seed meal per acre.
8 lbs. Nitrogen in Nitrate of soda per acre.
16 lbs Phosphoric acid in A. Phosphate per acre.
4 lbs. Potash in Potassium sulphate per acre.

The Nitrogen and Acid phosphate to be total in material and the potash to be based on water soluble only.
The Nitrogen in Cotton seed meal and the P_2O_5 to be applied to the soil before planting. The N. in $NaNO_3$ to be applied as a top dressing.

Plat 5.—8 tons manure as in 2.

" 6.—8 tons manure as in 2 plus chemical fertilizers as in 3.

" 8.—10 tons manure as in 2.

" 9.—10 tons manure as in 2, plus chemical fertilizers as in 3.

" 11.—6 tons of manure per acre applied in the drill.

" 12.—6 tons manure per acre applied in the drill plus chemical fertilizer as in 3.

" 14.—8 tons manure per acre applied as in 11.

" 15.—8 tons manure per acre applied as in 11 plus chemical fertilizer as in 3.

" 17.—10 tons manure applied as in 11.

" 18.—10 tons manure per acre applied as in 11 plus chemical fertilizer as in 3.

Fertilizers

COTTON.

Plats 1, 4, 7, 10, 13, 16 and 19: Permanent checks without treatment.

Plats 2, 5, 8, 11, 14, and 17: Residual effect of manure previously applied to corn, in the rotations.

Plats 3, 6, 9, 12, 15, and 18: In addition to residual effect of manure previously applied to corn, 8 lbs. nitrogen in cotton seed meal per acre; 32 lbs. P_2O_5 in acid phosphate per acre; 8 lbs. water soluble potash in potassium sulphate per acre.

The above fertilizers to be mixed and applied from ten days to two weeks before a planting. Applications to be under the row of cotton.

OATS.

Plats 1, 4, 7, 10, 13, 16 and 19: Permanent checks without manurial treatment.

Plats 2, 5, 8, 11, 14, 17: Residual effect of manure previously applied to corn.

Plats 3, 6, 9, 12, 15, 18: In addition to residual effect of manure applied to corn, 8 lbs. of nitrogen $NaNO_3$ per acre, the nitrate of soda to be applied when the first signs of growth take place in the spring.

COWPEAS.

Plats 1, 4, 7, 10, 13, 16 and 19: Permanent checks without treatment.

Plats 2, 5, 8, 11, 14, 17: Residual effect of manure previously applied to corn.

Plats 3, 6, 9, 12, 15, 18: In addition to residual effect of manure previously applied to corn, 32 lbs. phosphoric acid in acid phosphate per acre, the acid phosphate to be applied in the drill before or at the time of planting the cowpeas.

COTTON VARIETY TESTS.

Variety.	Source of Seed.	No. Bolls per lb.	Lbs. per Acre	Lint %
1. Cleveland Big Boll	Dr. L. C. Allen, Hoschton, Ga...	65	1500	35.0
2. Delfas 6102	Miss. Delta Exp. Sta. Weilerman.	88	2040	29.6
3. Express 630	C. A. McLendon, Atlanta, Ga....	80	1440	31.2
4. Delta Type Webber 8985	Ped. Seed Co., Hartsville, S. C...	70	1140	27.1
5. Dixie Wilt Resistant 8554	Ped. Seed Co., Hartsville, S. C...	67	1200	29.5
6. Webber 49-4	Ped. Seed Co., Hartsville, S. C...	71	1170	30.0
7. Cleveland Big Boll	Piedmont Ped. Seed Co., Commerce, Ga.	60	1200	33.2
8. Tri-Cook	M. R. Hall, James, Ala.....	66	1200	29.1
9. Dixie Triumph	L. O. Watson Seed Co., Florence, S. C.	60	1560	33.6
10. Webber 49-4	L. O. Watson Seed Co., Florence, S. C.	72	1170	30.0
11. Wanamaker-Cleveland B. B.	Model Seed Farm, St. Matthew, S. C.	57	1200	35.0
12. Cook 588	R. E. Hudson, Auburn, Ala.....	56	1200	30.0
13. Meade	Artesia Farms Co., Albany, Ga...	88	990	30.0
14. Mexican Big Boll	Edgecomb Exp. Sta., Rockyport, N. C.	55	1380	31.0
15. Alexander Wilt. Res	State Exp. Sta., Baton Rouge....	79	1290	31.3
16. La. Hybrid No. 143	State Exp. Sta., Baton Rouge....	80	1260	30.0
17. La. No. 1	State Exp. Sta., Baton Rouge....	88	1260	29.0
18. Covington-Toole Wilt-Res.	W. F. Covington, Headland, Ala.	73	1380	29.1
19. Cook 588	Ala. Exp. Sta., Auburn, Ala.....	60	1290	31.0
20. Cook 1346	Ala. Exp. Sta., Auburn, Ala.....	70	1320	30.0
21. Cleveland 903	Ala. Exp. Sta., Auburn, Ala.....	62	1200	31.0
22. Express 350	Holliman-White Co., Memphis, Tenn.	62	1530	31.3
23. Watson Wilt Resistant	L. O. Watson Seed Co., Florence, S. C.	70	1530	32.0

All of the above varieties were planted May 6, and picked September 7, 8, and 9. Lint percentages determined by Dr. Robert Glenk, Curator, State Museum, New Orleans, La.

In all variety tests one should not draw conclusions from results of one year. See previous reports for comparisons. It is seldom that any one variety gives the best results two years in succession.

Corn Variety Tests.

Variety	Source of Seed.	Bu. per A.
1. Ferguson's Pioneer	Ferguson Seed Farms, Sherman, Texas	35.72
2. Whatley's Prolific	Whatley Bros., Helena, Ga.	31.71
3. Ferguson's Yellow Dent	Ferguson Seed Farms, Sherman, Texas	32.23
4. Ferguson's Surcropper	Ferguson Seed Farms, Sherman, Texas	31.71
5. Ferguson's Chisholm	Ferguson Seed Farms, Sherman, Texas	27.50
6. Stewart's Yellow Dent	Nat Stewart, Plain Dealing, La.	33.49
7. Calhoun Red Cob	W. S. Powell, Stonewall, La.	30.76
8. Allen's Big Ear Prolific	Dr. L. C. Allen, Hoschton, Ga.	37.01
9. Imperial White Dent	Grant-Smith Co., Raceland, La.	28.24
10. Hastings Prolific	J. D. Rawlinson, Gallion, La.	36.48
11. Calhoun Red Cob	F. S. Veak, Tallulah, La.	32.59
12. Rockdale	R. T. Douglas, Gilliam, La.	34.96
13. Calhoun Red Cob	I. H. Haile, Linville, La.	34.96
14. Calhoun Red Cob	J. R. Crumpton, Minden, La.	34.75
15. Hastings Prolific	S. A. Meyers, Columbia, La.	33.75
16. Mosby's Prolific	R. C. Webb, Delta, La.	34.23
17. Mosby's Prolific	Miss. Delta Exp. Station, Weilerman, Miss.	39.74
18. Cocke's Prolific	Miss. Delta Exp. Station, Weilerman, Miss.	34.49
19. Calhoun Red Cob White Grain	State Experiment Station, Baton Rouge, La.	31.22
20. Calhoun Red Cob, Yellow Grain	State Experiment Station, Baton Rouge, La.	29.50
21. Calhoun Red Cob, White Grain	North La. Experiment Station, Calhoun, La.	33.02

April 10—Planted.

October 25—Harvested.

"PLACE EFFECT" COTTON VARIETY TESTS.

These experiments are carried on in cooperation with a number of state experiment stations, all of whom plant from the same lot of seed.

Variety	Source of Seed.	Lbs. per Acre	In old orchard [seed from last year's test
1. Coker's Delta Type Webber	Pedigreed Seed Co., Hartsville, S. C.	660	936
2. Express 433	Delta Experiment Station, Stoneville, Miss.	1020	1196
3. Cook 588	Ala. Experiment Station, Auburn, Ala.	900	962
4. Wanamaker Cleveland Big Boll	Model Seed Farm, St. Matthew, S. C.	960	1105
5. Trice	U. S. Dept. of Agriculture, Washington, D. C.	840	1092
6. Lone Star	U. S. Dept. of Agriculture, Washington, D. C.	810	1105
7. Acala	U. S. Dept. of Agriculture, Washington, D. C.	810	975

May 6—Planted Plot 10.
May 17—Planted Plot in orchard.
October 19—Picked both plots.

FORAGE CROP VARIETIES.

Plot 1. North of Barn.

Variety	Source of Seed	Percent Stand.	Weight Hay	Tons Per Acre
SOY BEANS:				
1. Biloxi	T. W. Wood & Sons, Richmond. Va.	100	38½	2.31
2. Biloxi	Chris Reuter, New Orleans, La..	100	31	1.86
3. Biloxi	H. G. Hastings, Atlanta, Ga...	100	27	1.62
4. Mammoth Yellow	T. W. Wood & Sons, Richmond, Va.	80	18¼	1.57
5. Mammoth Yellow	Chris Reuter, New Orleans.....	100	37	2.22
6. Mammoth Yellow	H. G. Hastings Co., Atlanta....	100	28¾	1.72
7. Otootan	Chris Reuter, New Orleans.....	100	59	3.54
8. Otootan	H. G. Hastings, Atlanta, Ga.....	100	47	2.82
9. Mongol	E. G. Lewis Seed Co., Media, Ill.	50	5	.60
10. Itosan	E. G. Lewis Seed Co., Media, Ill.	60	15	1.26
11. Ebony	E. G. Lewis Seed Co., Media, Ill.	80	22	1.58
12. Virginia	T. W. Wood & Sons, Richmond, Va.		18½	1.10
13. Tarheel Black	T. W. Wood & Sons, Richmond, Va.	90	21¾	1.43
14. Hollybrook	T. W. Wood & Sons, Richmond, Va.	75	20	1.50
15. Mammoth Yellow	T. W. Wood & Sons, Richmond, Va.	80	21¼	1.53
16. Barchet	North La. Exp. Station, Calhoun	10	3½	1.10

Seed planted June 22.

COWPEAS:		Wgt. Hay Lbs.	Tons per A.	Wgt. Seed Lbs.	Bu. per Acre
1. Groit	T. W. Wood & Sons, Richmond, Va.	40	2.40	5	6
2. Whippoorwill	T. W. Wood & Sons, Richmond, Va.	27	1.62	7	8.40
3. Brabham	T. W. Wood & Sons, Richmond, Va.	46	2.76	2	2.40
4. Taylor	T. W. Wood & Sons, Richmond, Va.	22	1.32	5	6.00
5. New Era	T. W. Wood & Sons, Richmond, Va.	14	.84	3½	4.20
6. Red Ripper	T. W. Wood & Sons, Richmond, Va.				
7. Clay	T. W. Wood & Sons, Richmond, Va.	29	1.74	2	2.40
8. Iron	T. W. Wood & Sons, Richmond, Va.	36	2.16	¾	.90
9. Cream Crowder	T. W. Wood & Sons, Richmond, Va.	20	1.20	2	2.40
10. Black	T. W. Wood & Sons, Richmond, Va.	25	1.50	2	2.40
11. Large White Black Eye	T. W. Wood & Sons, Richmond, Va.	Did not mature. Wilted			
12. "Purple Hull"	North La. Exp. Station, Calhoun	19	1.14	2½	3.00
13. White Crowder	North La. Exp. Station, Calhoun	Did not mature. Wilted			

Plot 2. North of Barn.

OATS.

Nov. 27, 1921—Drilled in oats. May 31, 1922—Harvested 1908 lbs. in straw, equal to 1.46 tons of hay per acre.

POTATOES.

July 1—Set out potato cuttings. November 2—Harvested 5,824 lbs. potatoes, 160 bushels.

Plot 3. North of Barn.

OATS.

Nov. 27, 1921—Drilled in oats. May 30, 1922—Grazed off by hogs.

POTATOES.

June 30—Set out potatoes. November 3—Harvested 5,440 lbs. potatoes, equal to 149.5 bushels per acre.

New Orchard. 2 Acres.

March 17—Set out "Model Farm Orchard." May 17—Planted cowpeas. July 29—Turned in hogs, 2,876 lbs. August 2—Weighed out hogs, 3,126 lbs. Gain, 250 lbs.

RESULTS OF COTTON DEMONSTRATION.

Area 2, North Lee Field.

12 ACRES.

	Man Hrs. Worked	Boy Hrs. Worked	Mule Hrs. Worked	
Discing, tractor and man				$5.47
Bedding land	25		25	
Fertilizer, (Phosphate $14.48, Nitrate of Soda $32.40)				$46.88
Applying Fertilizer (2 men, 22½ hrs. each)	45		45	
Other preparation before planting	45		45	
Seed, (32 bushels @ $1.00 per bu.)				$32.00
Planting	10½		10½	
Barring off	30		30	
Chopping	225	117½		
Dirting up	50		50	
Plowing out middles	35		35	
Sweeping up	45		45	
Plowing out middles	20		20	
Hoeing	145	65		
100 lbs. Calcium Arsenate				$14.00
Applying poison	20		10	
Picking 9,019 lbs. cotton at 75c per 100 lbs.				$67.64
Total	695½	182½	307	$166.19

Estimated ginning results, 3,006 lbs. lint; 6,012 lbs. seed.

RESULT OF CORN DEMONSTRATION.

Area No. 1, North Lee Field.

14 ACRES.

	Mule Hrs. Worked	Men Hrs. Worked	Boy Hrs. Worked	
Laying off rows	40	20		
Fertilizer (Acid Phosphate)				$20.64
Applying fertilizer		30		
Other preparation	104	89½		
Seed Corn				6.00
Planting	20	20		
Barring off	42½	42½		
Hoeing and Thinning		35		
Planting beans	30	30		
Cost of beans				7.00
Sweeping up corn	30	30		
Barring off beans	25	25		
Sweeping up beans	22½	22½		
Nitrate of Soda (1200 lbs. @ $7.20)				86.40
Laying by with turn plow	40	40		
Plowing out middle	30	30		
Harvesting	40	120		
Total	424	534½		$120.04

Corn harvested, 9,113 lbs., equal to 130.2 bushels.
Estimated yield of beans, 12,000 lbs.

South Lee Field

10¼ ACRES.

Preparation of soil for planting	65	50		
Tractor and Man				$ 2.60
Acid phosphate, (1500 lbs.)				12.90
Seed Corn				4.00
Barring off and other cultivation	75	85	30	
Nitrate of Soda (600 lbs. @ $7.12)				42.72
Harvesting	20	40		
Total	160	175	30	$64.22

Harvested 5,640 lbs. corn, equal to 80.57 bushels. Peas amounted to very little.

STATION NO. 4

RICE EXPERIMENT STATION

CROWLEY, LA.

Conducted in cooperation with the Bureau of Plant Industry, United Sates Department of Agriculture.

J. MITCHELL JENKINS,

Superintendent of the Station, and Assistant Agronomist, Office of Cereal Investigations, Bureau of Plant Industry.

It is gratifying to be able to report that the year 1922 stands out as the most satisfactory of the fourteen years we have been pursuing certain lines of investigation at this Station. Results obtained have strengthened past indications, and placed those in charge in a better position to be of service to the rice industry. Not only have the results on the Station been gratifying, but the general interest in the work of the Station, by those connected with rice, in various ways, was emphasized as never before in its history. This was clearly shown in the letters received, callers entertained, and character of information desired.

The only change made in the lines of investigation, as reported last year, was to discontinue, for the present, the irrigation experiment. This was done in order that certain weeds that had accumulated in these plats might be killed, and thus permit more satisfactory results in the future.

The average temperature for the growing season was practically the same as that of last year. The maximum temperature for the year was one hundred one degrees F. This is the fourth time one hundred or above has been recorded since 1910, and the first time since 1918. The precipitation was much greater during the growing season, and in fact for the entire year; a rainfall of 69.89 inches having been recorded. This is the heaviest annual precipitation that has been noted in the thirteen years we have been keeping the records. While the annual rainfall was great, it did not interfere to any extent with field operations. The month of April was relatively dry, and while the precipitation for May was heavy, it was rather evenly distributed, and seldom heavy enough to interfere, for long periods at a time, with preparation and seeding.

The Bureau of Entomology discontinued, in July, the services of their representative. This was rather unfortunate in that investigations that had been commenced had to be suspended until some future date. It is the understanding that this work will be taken up again during the coming year. Damage from insects, especially the stem borer, is becoming greater each year, and it seems only fitting that we should have some one devoting his entire time to this phase of investigation.

No work along pathological lines was done this year, for the reason that no one was detailed for this project, by either the State or National authorities. The importance of investigations along this line is suggested by the preliminary reports issued by the several pathologists that have been stationed here at short intervals from time to time. The latest report issued by the Office of Cereal Investigations, United States Department of Agriculture, and dealing with seedling blight and stack-burn of rice, based on work begun at this Station, indicates the necessity of further investigations along this line, to say nothing of the many other diseases, especially Piricularia oryzae which attacks all varieties to greater or less degree, and of which little is known as to its transmittal or control. As far back as 1913, the writer forwarded diseased rice seedlings to Washington, and called attention to the large number of acres of early rice that had to be reseeded on account of this condition. At intervals since that time, this disease has been given attention, but not until this year has there been sufficient data accumulated upon which to issue a publication.

The demand for seed of rice varieties distributed by this Station has greatly increased, and the only reason, apparently, for not having a much greater acreage in some of them, is the fact that there is little clean land available for producing high class seed. In the past, the farmer has given entirely too little attention to the matter of seed rice. Since the beginning of this Station, this subject has been given especial attention, and at all times, farmers have been advised and encouraged to make special provision along this line, still every year one desiring good seed has to search, sometimes, the entire belt before he finds it, if ever. In 1921, there was evidence of a desire for bettering this

condition, and in 1922 the matter took definite form. There was a time when few farmers thought of securing seed before spring; this year, the search was begun long before seeding time, and in fact, the fall before. There are several farmers and firms setting out to specialize in various varieties of seed rice, and it is to be hoped that within the next few years, the Station will be able to direct purchasers to parties having good seed, and not have to inform them that we know of no one having good seed, as we have been forced to do, especially during the past two years. One particularly encouraging thing in this whole matter is that many farmers refuse to buy seed unless it is absolutely free of weed seed, especially red rice.

During the past year, there was a growing interest in the soy bean, on the part of rice farmers. The results secured on the Station for the past six years, have gone a long way towards convincing the rice grower of the possibilities of their becoming a profitable crop from the standpoint of returns from the bean, as well as its advantageous effect upon the soil. The seed of the Biloxi variety grown on the Station was readily disposed of in this section. Several farmers have a small acreage, and one company seeded two hundred and sixty acres. The results secured by them were not as good as those obtained on the Station; however, this was no fault of the bean, but due to lack of experience in handling the crop. We are having frequent calls for information regarding bean seed, and bean harvesting machinery. The entire crop of eighty bushels of Biloxi seed produced this year on the Station has already been disposed of. Local men are now looking elsewhere for seed of this variety. There is little doubt but that in the course of a few more years the greater part of the rice lands that now lie idle each year will be seeded to the soy bean, and when this comes to pass, soy bean oil mills will be built throughout the rice belt. The oil cake from these mills will furnish an excellent substitute for some of the other materials that are now purchased for use in manufacturing mixed feeds.

The rice farmers seem to lack, in large measure, that deep interest and pride in their farms that they ought to have, and until this is developed in them to the extent of exerting every energy to have the cleanest land, produce the heaviest yields,

and sell the highest quality rice, this section of Louisiana will never take the high stand as a farming community that it is capable of attaining.

A department bulletin is now in the government press in Washington, and will be issued early in 1923. This publication deals with seven new varieties of rice that have been developed at this Station, giving their behavior over a long period of years, as compared with several long established varieties.

EQUIPMENT.

The Station equipment was in no way increased during the past year. It is especially desirous that a small rat proof building be erected to be used exclusively as a store-house for seed. This is important, considering that at present the laboratory building has to be used for this purpose. This, while being inconvenient and unattractive, is damaging to the building.

Another improvement that would make operations on the Station more convenient, efficient, and in the end economical, would be to connect our deep well and buildings with the city electric plant. The Crowley equipment has been enlarged, and in every way improved, and is now sufficiently powerful to furnish much current in addition to that needed within its limits. The present motive power used in operating the deep well for irrigation purposes requires the attention of one man all the time that it is in operation, and if anything happens, and this is often, four or five men are required, sometimes the greater part of a day. The high price of gasoline, which is used as fuel, is also quite an item of expense. Electrical equipment would require practically no attention after set in motion.

FOREIGN VISITORS.

Foreigners continue to call on us for information pertaining to rice, both by letter and in person. During the year, we had one visitor from each of the following countries: Africa, Belgium, Siam, India, and the Philippine Islands.

THE FRUIT AND TRUCK EXPERIMENT STATION

HAMMOND, LA.

B. Szymoniak, Horticulturist in Charge.

The Fruit and Truck Experiment Station farm donated by Tangipahoa parish to the Louisiana State University, for experimental purposes, as more fully set forth in the report for 1921, was taken in charge on February 1, 1922.

As the buildings and fences were in bad repair it was necessary to spend a considerable amount of money in rebuilding the fences, repairing and painting the house, cleaning accumulated rubbish from fence rows to prevent losses of poles from fire, and in removing stumps etc., so as to put the ground in good condition before beginning experimental work.

Approximately three thousand stumps were removed from the cultivated area, two thousand feet of new fencing put in and the remaining portion of the fences rebuilt on straight lines and some new land was included in the fenced area.

A topographic survey of the entire farm was made by C. E. Moore, Civil Engineer of Tangipahoa parish, and a soil survey of the entire farm was made by A. F. Kidder, Agronomist of the Experiment Station, Baton Rouge. Soil samples in all areas were taken and are being analyzed in the chemical laboratory at Baton Rouge. All of this data will be assembled and put in proper form for permanent records as rapidly as opportunity will permit.

An artesian well with a four inch pipe was sunk to a depth of 365 feet, which is giving a flow of thirty-five gallons per minute of exceptionally fine water. A storage tank will be constructed for providing a reserve supply of water for irrigation of any portion of the farm that may be put under irrigation experiments in the future.

An up-to-date Delco light plant and water pump has been installed and water connection established for the kitchen and bath of the residence.

A poultry yard has been built for demonstration of a farm flock and a foundation flock has been purchased.

One acre of land has been planted to fruit trees in accordance with the plans of the "Home Orchard Campaign" of the Experi-

ment Station and the Extension Division of the University, and also home garden plantings have been made in accordance with plans for home gardens throughout the State.

STRAWBERRY FERTILIZER EXPERIMENTS.

Fertilizer experiments were planned in accordance with what is known as the triangular method of testing amount of ingredients and most desirable combination of nitrogen, phosphoric acid and potash for strawberries. Four and eight-tenths acres are devoted to these experiments, including typical applications of 1-2-3 ingredients named above, in different amounts and different ratios. The plantings were made during November and the crop will be harvested in the spring of 1923.

COMPARATIVE MERITS OF STRAWBERRY PLANTINGS FROM DIFFERENT REGIONS OF THE UNITED STATES.

A comparison is being made of the vigor of growth and productiveness of strawberry plants secured from North Carolina and Arkansas, where the nursery production of strawberry plants is most highly developed, with the home grown plants. Several thousand plants are included in each plot for this comparison and all are now growing nicely, with the present indication that the Louisiana grown plants are of superior merit.

VARIETY TESTS.

In the strawberry variety tests, comparisons are being made of ten of the most promising strawberry varieties. Plantings were made in November and the crop will be harvested in the spring of 1923.

MUSCADINE GRAPES.

It is planned to give considerable attention to the possibility of developing the muscadine grape for the cut-over pine lands of Louisiana. This work is carried on in cooperation with the United States Department of Agriculture. One acre will be devoted to the collection of different varieties of muscadines; two acres will be devoted to the Thomas variety, for experiments in methods of pruning and training, and one acre to the Luolo variety for the same purpose. One-fourth of an acre will be devoted to the James variety, one-fourth to Memory, one-fourth to Flowers, one-fourth to Mish and one-fourth to Scuppernongs with the view of testing the relative merits of these varieties.

BLACKBERRIES.

Two acres have been planted to MacDonald interplanted with Lucretia dewberries for pollination. The luxuriant growth of wild berries in this region would indicate that commercial developments are possible for this fruit.

PECAN TREES.

In cooperation with the Pecan Specialist of the United States Department of Agriculture, we have put out ten trees each of five standard varieties of pecans for experimental work in fertilizer and variety demonstrations.

ROTATION EXPERIMENTS.

One three-year rotation experiment and two two-year rotation experiments have been established with the view of determining the most effective and economical means of maintaining the nitrogen supply of the soil to lessen the disastrous results of protracted dry weather on the one hand or excessive rainfall on the other. Cowpeas, soy beans and velvet beans are the legumes used on these rotations.

CHANGES IN STAFF.

G. D. Cain, Assistant Director in charge of the North Louisiana Experiment Station at Calhoun, resigned January 1, 1922, to go into Extension work as County Agent. Sidney Stewart was appointed Superintendent of the Calhourn Station, to succeed Mr. Cain.

Boleslaus Szymoniak, Pecan Specialist of the Extension Division, was appointed Horticulturist in charge of the Fruit and Truck Station, at Hammond, La., February 1, 1922.

W. G. Raines, Assistant Research Chemist at the Sugar Experiment Station, New Orleans, resigned December, 1922, to accept a position with a large sugar company in the tropics.

A. D. Lipscomb, Assistant Chemist in the Fertilizer and Feed Stuffs Laboratory, resigned September, 1922, to go into the retail drug business at Auburn, Ala.

A. A. Ormsby, Specialist in Fair Exhibits, resigned April 1, 1922, to accept the position of Secretary-Manager of the Florida Parishes Fair, at Hammond, La.

L. B. Eastland, appointed to succeed Mr. Ormsby, resigned January 1, 1923, to go into the life insurance business in Baton Rouge.

Mrs. Helen Hardy, Mailing Secretary, resigned October 1, 1922.

Pierre Hernandez was appointed Assistant Agronomist, July 1, 1922.

Compton R. Hummel, Assistant Chemist in the Fertilizer and Feed Stuffs Laboratory, is now in Charge of Experiment Station Records.

PUBLICATIONS.

Annual Report for 1921.

INVENTORY OF EXPERIMENT STATION PROPERTY

During the past year we have more completely systematized our records pertaining to the property and equipment of the Experiment Stations, and have assigned Mr. Compton R. Hummel to the work of keeping an inventory that will show, at the end of each quarter, the property and equipment that has been added, as well as that which has been disposed of. Of course we have a great deal of property in the way of materials and specimens used in experimental work that has great value from a scientific viewpoint but no commercial value.

The figures given below pertain wholly to commerical values.

	Livestock	Tools and Implements	Apparatus	Chemicals
Non-Expendable Property	.....	$12,798.63	$22,240.94	.....
Expendable Property	$23,407.00	104.89	2,381.36	$ 1,534.27
Total	$23,407.00	$12,903.52	$24,622.30	$ 1,534.27

	Furniture Fixtures	Miscell'n's	Total
Non-Expendable Property	$ 5,160.86	$ 3,154.21	$43,354.64
Expendable Property	3.60	1,179.47	28,610.59
Total	$ 5,164.46	$ 4,338.68	$71,965.23

Note—These figures do not include any of the libraries.

Automobiles and trucks are included in "Miscellaneous Non-Expendable."

Stationery and office supplies included in "Miscellaneous Expendable."

Inventory includes property of the Experiment Station Dairy up to June 9, 1923.

FINANCIAL STATEMENT

	Hatch Fund	Adams Fund
Dr.		
Receipts from the Treasurer of the United States, as per appropriations for the fiscal year ended June 30, 1922, under Acts of Congress aproved March 2, 1887 (Hatch Fund) and March 16, 1906, (Adams Fund)	$15,000.00	$15,000.00
Cr.		
Salaries	$ 9,056.81	$10,999.94
Labor	2,964.18	575.00
Publications	325.52	.....
Postage and Stationery	164.44	47.70
Freight and Express	56.83	66.52
Heat, Light and Water	445.69	286.49
Chemical Supplies	.....	707.51
Seeds and Sundries	224.59	157.35
Fertilizers	10.00	5.12
Feeding Stuffs	403.05	61.40
Library	93.65	172.01
Tools, Implements and Machinery	122.31	.....
Furniture and Fixtures	232.70	168.51
Scientific Apparatus	.....	1,508.70
Livestock	.....	.....
Traveling Expense	562.35	179.85
Contingent Expense	75.56	.....
Building and Repairs	272.32	63.90
Total	$15,000.00	$15,000.00

STATE FUND.

Receipts and Expenditures from January 1, 1922, to December 31, 1922, Inclusive.

RECEIPTS.

State Appropriation	$45,000.00	
Refunds	4,688.09	
Interest on Daily Balance	178.54	
Sales of Farm Products	6,076.44	
Loan from Evangeline Bank & Trust Co.	10,000.00	
Total Receipts	$65,943.07	
Balance on Hand January 1, 1922	5,822.50	
Total (Balance and Receipts)	$71,765.57	
Overdraft December 31, 1922	1,329.14	
Total Receipts and Overdraft		$73,094.71

EXPENDITURES.

Salaries	$26,238.21	
Labor	14,795.80	
Publications	334.66	
Postage and Stationery	690.99	
Freight and Express	893.34	
Heat, Light and Water	642.86	
Chemical Supplies	35.84	
Seed and Sundries	2,503.80	
Fertilizer	687.58	
Feed Stuffs	1,136.84	
Library	78.16	
Tools, Implements and Machinery	3,512.57	
Furniture and Fixtures	1,702.60	
Scientific Apparatus	1,086.07	
Livestock	998.21	
Traveling Expenses	2,139.17	
Repayment of Loan to Evangeline Bank & Trust Company	7,000.00	
Contingent Expenses	3,616.24	
Building and Repairs	5,001.77	
Total Expenditures		$73,094.71

FERTILIZER AND FEED STUFFS FUND.

Receipts and Expenditures from January 1, 1922, to December 31, 1922, inclusive.

RECEIPTS.

Commissioner of Agriculture	$24,720.75	
Refunds	79.50	
Total Receipts	$24,800.25	
Balance on Hand January 1, 1922	6,748.32	
Total (Balance and Receipts)		$31,548.57

EXPENDITURES.

Salaries	$16,860.74	
Labor	1,881.80	
Postage and Stationery	391.70	
Freight and Express	122.37	
Heat, Light and Water	687.95	
Chemical Supplies	3,089.63	
Seeds and Sundries	229.13	
Fertilizer		
Library	33.60	
Tools, Implements and Machinery	118.05	
Furniture and Fixtures	670.21	
Scientific Apparatus	2,758.37	
Traveling Expenses	219.21	
Contingent Expenses	139.50	
Building and Repairs	1,315.70	
Total Expenditures	$28,517.96	
Balance on Hand, December 31, 1922	3,030.61	
Total Expenditures and Balance		$31,548.57

EXPERIMENT STATION DAIRY FUND.

RECEIPTS.

Sale of Milk	$ 5,191.16	
Sale of Livestock	1,835.20	
Miscellaneous Sales	48.60	
Total Receipts	$ 7,074.96	
Balance on Hand January 1, 1922	374.03	
Total (Receipts and Balance)		$7,448.99

EXPENDITURES.

Labor	$ 2,880.02	
Seeds and Sundries	1,262.59	
Feed Stuffs	2,444.52	
Tools, Implements and Machinery	48.59	
Livestock	700.00	
Building and Repairs	96.92	
Total	$ 7,432.64	
Balance on Hand December 31, 1922	16.35	
Total Expenditures and Balance		$ 7,448.99